

Advanced Structured Materials

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Biomaterials and Medical Devices

A Perspective from an Emerging Country

 Springer

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*To
Amélie and Maïka (Hermawan)
Dhila and Hani (Mahyudin)
And our beloved country Indonesia*

Preface

In September 2012, about two hundred Indonesian scientists working in the biomaterials field gathered at the first national symposium on biomaterials hosted by Bogor Agricultural University in Bogor, Indonesia. A year later, the Indonesian Biomaterials Society¹ was officially launched. One of the strong wishes of this newly born society was to publish a book as a way to introduce and disseminate the works of Indonesian biomaterials scientists worldwide. After facing some challenges during the publication process, we finally present this book, “Biomaterials and Medical Devices: A Perspective from An Emerging Country.”

The book covers the current development and future direction of biomaterials and medical devices in Indonesia, including the government policies and directives. In particular, it highlights the unique needs of Indonesian healthcare service, the abundant potential for natural resource for biomaterials, and the challenge for medical devices development. Indonesia, with its 255 million population, 900 billion USD of GDP with 5 % annual growth, and 72 years of life expectancy is an emerging country having great economic potential. The government has launched a new pro-public universal healthcare program, which at one point stimulates the development of biomaterials aiming for national independency on producing medical devices. The book is written by selected Indonesian experts from academics, clinics, and government agencies. It should be viewed as a reference for researchers directing their research, for industries developing and marketing their products, and for the government setting new policies. The perspectives and the lessons learned from Indonesia could be then adopted for the development of biomaterials and medical devices in other emerging countries facing similar challenges.

¹Indonesian Biomaterials Society (*Masyarakat Biomaterial Indonesia*), is an independent not-for-profit professional society having an orientation toward the development of science and technology of biomaterials and medical devices in Indonesia. Further information can be found at: <http://biomaterial.or.id>.

We start the book's coverage with the chapter "[Structure and Properties of Biomaterials](#)" which introduces the structure and properties of biomaterials as an opening to understand the science and technology of biomaterials. Chapter "[Naturally Derived Biomaterials and Its Processing](#)" covers biomaterials processing with special focus on various unconventional methods for synthesizing natural biomaterials, where its sources are abundant in Indonesia. The biocompatibility issues of biomaterials that include cytotoxicity, genotoxicity, in vitro and in vivo models, and some biocompatibility data extracted from many cases in Indonesia is presented in chapter "[Biocompatibility Issues of Biomaterials](#)." It is followed by the chapter "[Animal Study and Pre-clinical Trials of Biomaterials](#)" reviews the animal study and clinical trials of biomaterials, which include animal models for biomaterial research, ethics, care and use, implantation study and monitoring, and experiences on animal study of medical implants in Indonesia. Chapter "[Bioadhesion of Biomaterials](#)" covers the bioadhesion aspect of biomaterials as one of the fundamental sciences to understand implant–host interaction. Chapter "[Degradable Biomaterials for Temporary Medical Implants](#)" describes degradable biomaterials as a new generation of materials for temporarily needed medical devices, which may find its suitability for lowering the overall cost of implant surgical procedures. Chapter "[Biomaterials in Orthopaedics](#)" covers biomaterials for orthopedic applications with special focus on the most common surgical intervention and type of implants used in Indonesia. Meanwhile, biomaterials in dentistry are covered in the chapter "[Biomaterials in Dentistry](#)" including its current state and development in Indonesia. Chapter "[Tissue Bank and Tissue Engineering](#)" covers tissue bank and tissue engineering with the latest status of its institute in Indonesia. And finally, the chapter "[Indonesian Perspective on Biomaterials and Medical Devices](#)" concludes the book with a general overview of the Indonesian Government policies and directives on biomaterials and medical devices, and the challenge and opportunity for the development of biomaterials in Indonesia.

We acknowledge Prof. Andreas Öchsner of Griffith University, Australia, an editor at Springer, who has facilitated the publication process of this book with the publisher. We sincerely thank all the authors, and the people around them, for their commitment and tireless efforts in writing their chapters to finally realize our book. We will continue to collaborate and keep our synergy in answering the Indonesian healthcare challenges via research and development of effective and low-cost biomaterials and medical devices. Hopefully, this book inspires more scientists in Indonesia and other emerging countries to proudly present their high quality works at the international stage and be the champions beyond their native niche (Indonesian proverb: *tidak cuma jago kandang*).

Ferdiansyah Mahyudin
Hendra Hermawan

Contents

Structure and Properties of Biomaterials	1
Sulistioso Giat Sukaryo, Agung Purnama and Hendra Hermawan	
Naturally Derived Biomaterials and Its Processing	23
Raden Dadan Ramdan, Bambang Sunendar and Hendra Hermawan	
Biocompatibility Issues of Biomaterials	41
Widowati Siswomihardjo	
Animal Study and Pre-clinical Trials of Biomaterials	67
Deni Noviana, Sri Estuningsih and Mokhamad Fakhrol Ulum	
Bioadhesion of Biomaterials	103
Siti Sunarintyas	
Degradable Biomaterials for Temporary Medical Implants	127
Ahmad Kafrawi Nasution and Hendra Hermawan	
Biomaterials in Orthopaedics	161
Ferdiansyah Mahyudin, Lukas Widhiyanto and Hendra Hermawan	
Biomaterials in Dentistry	183
Margareta Rinastiti	
Tissue Bank and Tissue Engineering	207
Ferdiansyah Mahyudin and Heri Suroto	
Indonesian Perspective on Biomaterials and Medical Devices	235
Ferdiansyah Mahyudin, Sulistioso Giat Sukaryo, Widowati Siswomihardjo and Hendra Hermawan	

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²More about Universitas Airlangga: www.unair.ac.id.

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⁶More about Badan Tenaga Atom Nasional: www.batan.go.id.

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